

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)
LONG ISLAND LIGHTING COMPANY) Docket No. 50-322-OL-6
(Shoreham Nuclear Power) (25% Power)
Station, Unit 1))
)

AFFIDAVIT OF GREGORY C. MINOR AND STEVEN C. SHOLLY

Gregory C. Minor and Steven C. Sholly, being under oath,
depose and say as follows:

1. (Minor) I received a BSEE in electrical engineering from the University of California at Berkeley in 1960 and a MSEE in electrical engineering from Stanford University in 1966. I have 27 years experience with nuclear power and related areas. In particular, for 16 years I was employed by the General Electric Company where I worked on matters relating to the design, construction and operation of nuclear monitoring and safety systems, including hands-on experience at reactor sites. I have been a consultant with MHB Technical Associates for 11 years, during which time I have been involved in a wide variety of consulting projects, many of them related to the probabilistic risk assessments ("PRAs") for nuclear power plants and reviews of

nuclear plant safety and licensing. These include a PRA for the Barseback Nuclear Plant in Sweden and contribution to a PRA for the Caruso plant in Italy, plus testimony in the Shoreham proceeding on evacuation/sheltering issues using dose projections resulting from computer-generated accident and dose assessments.

I have testified as an expert witness in numerous proceedings before the Nuclear Regulatory Commission ("NRC") and other bodies, including both the health and safety and prior emergency planning proceedings in this Shoreham litigation. I am a member of the Nuclear Power Plant Standards Committee of the Instrument Society of America, and I served as a peer reviewer with the NRC's TMI Accident Investigation Report. I am also co-holder of a patent on a nuclear monitoring system.

(Sholly) I am an Associate Consultant with MHB Technical Associates. I have more than five years experience in the performance and review of probabilistic analysis of nuclear power plant safety issues, including the review of PRA studies and the application of PRA results to the assessment of generic issues and emergency planning practices and procedures. I have served as a member of the peer review group on regulatory applications of PRAs (NUREG 1050) and as a member of the Workshop on Containment Performance Objectives (as part of NRC's Safety Goal Program). I have testified in NRC proceedings on the Indian Point and Catawba plants concerning PRAs and their application to emergency planning.

2. We have reviewed the March 31, 1988 Affidavit of Mr. Edward J. Youngling ("Youngling Affidavit") submitted in support of LILCO's April 1, 1988 Brief on the "Substantive Relevance" of the Remaining Emergency Planning Contentions at 25% Power (the "LILCO Brief"). We have also reviewed the LILCO Brief itself and LILCO's April 27, 1987 Request for Authorization To Increase Power To 25%.

3. The Youngling Affidavit states that:

Analyses were performed in which the representative severe accident sequence was selected for each plant damage state and corresponding release category on the basis of its frequency contribution, severity of radiological release and time of release. The selection of the representative severe accidents sequence was based on the results of the 25% power PRA and an engineering assessment of the applicability of the chosen sequence to the release category and plant damage state.

Youngling Affidavit, ¶6 (emphasis supplied). Based on this analysis, Mr. Youngling classifies the percentage of accidents requiring certain amounts of time to proceed from initiating events to an offsite radiation release.

4. Even the summary description in the Youngling Affidavit establishes that the analysis performed by Mr. Youngling has gone at least one step beyond the LILCO PRA for 25% power. In particular, the Youngling analysis has taken raw data regarding the probability of certain events and sequences and made several

undocumented analytical and judgmental manipulations of the data to arrive at the stated conclusions.

5. As we stated in an affidavit previously submitted to the Commission concerning LILCO's application to operate at 25% power, a meaningful review of a PRA is a time consuming and complex process.^{1/} Because the analysis described in the Youngling Affidavit has gone beyond the PRA, LILCO has injected yet another area of technical analysis into the case. In particular, it appears from the Youngling Affidavit that LILCO sorted data and accident sequences several times and applied some unspecified criteria to make additional segregation of the data in order to reduce certain figures related to percentage of core melt accidents falling into a specific category.

6. The validity of the Youngling Affidavit and its conclusions cannot be judged based on the information supplied in the Youngling Affidavit. Based on our preliminary review, the following information is the minimum which would have to be collected and analyzed before the validity of Mr. Youngling's analyses and conclusions could be assessed:

a. What processes and criteria were used in selecting the "representative severe accident sequence"..."for each plant damage state and corresponding release category on the basis of" frequency contribution. (Youngling Affidavit at ¶6)

^{1/} See Suffolk County, State of New York and Town of Southampton Response in Opposition to LILCO's Motion for Expedited Commission Consideration (April 27, 1987), Affidavit of Gregory C. Minor and Steven C. Sholly, ¶ 4. The Staff has not yet completed its review and published a Safety Evaluation Report for the LILCO 25% power PRA, so that a meaningful government review of the PRA is still in the future.

b. What processes and criteria were used in selecting the "representative severe accident sequence"..."for each plant damage state and corresponding release category on the basis of" severity and radiological release. (Youngling Affidavit at ¶6)

c. What processes and criteria were used in selecting the "representative severe accident sequence"..." for each plant damage state and corresponding release category on the basis of" time of release. (Affidavit at ¶6)

d. What were the first place, second place and third place alternate choices in each of the categories identified in the above three areas.

e. What were the bases for the "Engineering Assessment" referred to in the Youngling Affidavit at p. 2, para. 6.

f. What is the uncertainty range of each numerical value entered on Table 1 of the Youngling Affidavit.

g. What accident sequences for the 25% power analysis are included in the "3.3% of core melt accidents which proceed from the initiating event to an offsite radiological release in about one hour" as indicated in the Youngling Affidavit at p. 2, para. 7.

h. What accident sequences for the 100% power analyses are included in the "6% of all core melt accidents [which] progress from their initiating events to offsite radiation release in about 1 hour," as indicated in the Youngling Affidavit at p. 2, para. 8.

i. Are results of the 25% power PRA and the undefined 100% power PRA directly comparable and are the two analyses based on identical assumptions?

j. What accident sequences are included in the "0.5% of all core melt accidents at 25% power [which] require less than seven hours to proceed from their initiating event to offsite radiation releases," as indicated in Affidavit at p. 3, para. 9.

k. What were the criteria used to set the threshold for seismic events being "well-beyond the safe shutdown earthquake" as used in Affidavit at page 3, para 9.

Moreover, once the above information is obtained and analyzed, additional information would almost certainly be necessary for an adequate analysis of the Youngling analyses and conclusions.

7. In addition, although substantial information is necessary before the Younglings analyses can be fully understood or its accuracy and completeness evaluated, it appears from the face of the Affidavit that the Mr. Youngling misapplies PRA methodology in drawing his conclusions. The plant damage states characterized in the affidavit are in fact limited and discrete representations of what is in reality a continuous spectrum of accident release characteristics, including release magnitudes and release timing. In essence, the Youngling Affidavit analyzes the data from only two discrete release types, one with a one hour release and one with a seven hour release, and presents arguments to suggest that there is almost nothing left between one and seven hours. This is incorrect. In fact, there is a continuous spectrum of releases, both in terms of magnitude and timing. If Youngling had taken this continuum into account, the results of his analysis would have been different.

8. In summary, without significantly more information, the validity of the analyses and conclusions referenced in the Youngling Affidavit cannot be assessed or determined. However, based on the face of the affidavit, it appears that the Youngling Affidavit misapplies PRA methodology in reaching its conclusions.

Gregory C. Minor

Gregory C. Minor

Steven C. Sholly

Steven C. Sholly

Sworn to and subscribed before me this 21st day of
April 1988.

Jane M. Garton

(Notary Public)

My commission expires: October 14, 1991

April 21, 1988 APR 26 P2:43

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
DOCKETING & SERVICE
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Before the Atomic Safety and Licensing Board

In the Matter of)
LONG ISLAND LIGHTING COMPANY) Docket No. 50-322-OL-6
(Shoreham Nuclear Power Station,) (25% Power)
Unit 1))

CERTIFICATE OF SERVICE

I hereby certify that copies of GOVERNMENTS' RESPONSE TO LILCO'S BRIEF ON THE RELEVANCE OF PENDING CONTENTIONS TO LILCO'S 25% POWER MOTION have been served on the following this 21st day of April, 1988 by U.S. mail, first class, except as otherwise noted.

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